CLAIMS

What is claimed is:

1. A nucleus for an artificial disc for replacing the natural disc of a human spine and being adapted to fit between and move relative to upper and lower end plates that are attached to adjacent vertebrae, comprising:

    a. a nucleus body having at least one bearing surface for engaging a cooperating bearing surface formed on one or more of the end plates, respectively;

    b. said at least one bearing surface having a curved portion that is adapted to engage a curved bearing surface on said one of the end plates;

    c. a flattened portion formed on the curved portion for maintaining a preferred orientation of at least one of the end plates relative to the nucleus.

2. The nucleus of claim 1, wherein the nucleus body is spherical in shape with curved portions formed on upper and lower bearing surfaces.

3. The nucleus of claim 2, wherein the curved portion of the upper bearing surface is hemispherical in shape, and the lower bearing surface is planar.

4. The nucleus of claim 1, wherein the nucleus body is ovoid in shape with curved portions formed on upper and lower bearing surfaces.

5. The nucleus of claim 4, wherein the curved portion of the upper bearing surface is ovoid in shape, and the lower bearing surface is planar.

6. The nucleus of claim 1, wherein the nucleus body is asymmetrical.

7. The nucleus of claim 1, wherein the flattened portion is planar.

8. The nucleus of claim 1, wherein the flattened portion is convex and has a radius of curvature much greater than the radius of curvature of the curved portion.

9. The nucleus of claim 1, wherein the flattened portion is concave.

10. The nucleus of claim 1, wherein nucleus has a horizontal axis and the flattened portion is formed at an angle other than parallel relative to the horizontal axis for maintaining a correction orientation of the artificial disc when the nucleus engages the end plates.

11. The nucleus of claim 1, wherein the nucleus body is elongated with a pair of outer ends, the curved portion comprising curved portions at the outer ends and a flattened portion between the curved portions.

12. The nucleus of claim 10, wherein the curved portions are spherical in shape.

13. The nucleus of claim 10, wherein the flattened portion is cylindrical in shape.

14. The nucleus of claim 10, wherein the lower bearing surface is planar.

15. The nucleus of claim 1, where the nucleus body is formed of a pair of cylinders that can move relative to each other.

16. The nucleus of claim 1, wherein the nucleus body is formed of a polymeric material.

17. The nucleus of claim 1, wherein the nucleus body is formed of a resilient material.

18. The nucleus of claim 1, wherein the nucleus body is formed of a material that has one or more portions that are more resilient than one or more other portions.

19. The nucleus of claim 1 and further including a pair of end plates adapted to be attached to adjacent vertebrae, the nucleus body being positioned between the end plates to form a total disc replacement (TDR).

20. The nucleus of claim 19, wherein the end plates are shaped to have a greater dimension in the either the posterior or anterior side in order to provide for deformity correction.

21. The nucleus of claim 20, wherein the greater dimension is on the anterior side.

22. The nucleus of claim 20, wherein the greater dimension is on the posterior side.

23. The nucleus of claim 19, and further including a pair of keels on the outer end of one end plate and one keel on the outer end of the other end plate.

24. The nucleus of claim 19, wherein one of the end plates has a bearing surface that has essentially the same curvature as the cooperating bearing surface on the nucleus body.

25. The nucleus of claim 19, wherein one of the end plates has a bearing surface that has a greater curvature than the cooperating bearing surface on the nucleus body.

26. The nucleus of claim 19, wherein the nucleus body has a flattened bearing surface, and one of end plates has a trough for engaging the flattened bearing surface.

27. The nucleus of claim 26, wherein the trough has lateral dimensions greater than the flattened bearing surface of the nucleus body for allowing the nucleus to have a range of motion relative to the end plate.

28. The nucleus of claim 26, wherein the trough has a bearing surface that curves upwardly on its side to provide a gradual stop utilizing distraction of adjacent vertebrae.

29. The nucleus of claim 19, wherein the end plates have at least one stop outside the range of motion of the nucleus, which utilizes distraction of adjacent vertebrae to assist in a gradual stop.

30. A total disc replacement, comprising:

a pair of end plates with outer surfaces adapted for attachment to adjacent vertebrae;

a nucleus body shaped and dimensioned to be positioned between the pair of end plates;

each end plate having an inner surface for engaging the nucleus;

at least one of the end plates having a bearing surface for cooperating with a bearing surface located on the inner surface of one of the endplates;

the nucleus shaped such that the maximum load bearing portion is located in a non-central location of the nucleus body.

31. The total disc replacement of claim 30, wherein the nucleus body is asymmetrical.